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PATENT APPLICATION

ATTORNEY DOCKET NO. 200315625-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Andrew L. Van Brocklin et al.

Application No.: 10/782,488

Filing Date: February 18, 2004

Confirmation No.: 5877

Examiner: DETSCHEL, Marissa

Group Art Unit: 2877

Title: Calibration Feedback-Control Circuit for Diffraction Light Devices

Mail Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
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TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on October 13, 2006.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month $120	☐ 2nd Month $450	☐ 3rd Month $1020	☐ 4th Month $1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $ 500. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees. A duplicate copy of this sheet is enclosed.

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Respectfully submitted,
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Application No.: 10/782,488 Attorney Docket No.: 200315625-1

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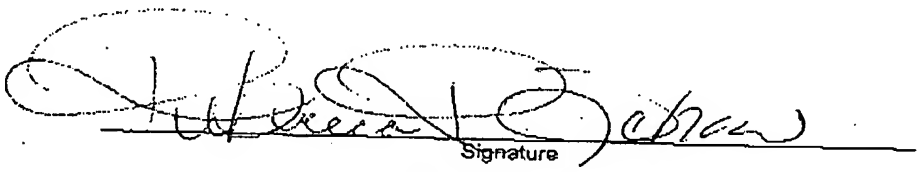

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1. Transmittal of Appeal Brief with Duplicate Copy (2 pages)
2. Certificate of Transmission (1 page)
3. Appeal Brief (15 pages)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Patent Application of

Andrew L. Van Brocklin et al.

Application No. 10/782,488

Filed: February 18, 2004

For: Calibration Feedback-Control Circuit for Diffraction Light Devices

Group Art Unit: 2877

Examiner: DETSCHEL, Marissa

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief under Rule 41.37 appealing the final decision of the Primary Examiner dated July 13, 2006. Each of the topics required by Rule 41.37 is presented herewith and is labeled appropriately.

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I. Real Party in Interest

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. Related Appeals and Interferences

There are no appeals or interferences related to the present application of which the Appellants are aware.

III. Status of Claims

Claims 8-17 and 26-30 are allowed. Claims 3-7, 9-12, 19-25 and 32-36 have been indicated as containing allowable subject matter.

Claims 1, 2, 18 and 31 stand finally rejected. Appellant is *not* appealing the rejection of claims 1 and 2, but does appeal from the final rejection of claims 18 and 31.

The pending claims are presented in the Appendix as required by 37 C.F.R. § 41.37. The allowed claims are not listed as they are not involved in this appeal.

IV. Status of Amendments

Following the final Office Action of July 13, 2006, Appellant attempted to simplify the issues remaining for this appeal by filing a single after-final amendment on September 6, 2006. That amendment proposed to cancel claims 1 and 2 without prejudice or disclaimer,

and to rewrite claims 3 and 4 into independent form based on the indication of allowable subject matter in those claims. No other changes to the application were proposed.

However, in an Advisory Action dated September 15, 2006, the Examiner inexplicably and inappropriately refused entry to the after-final amendment of September 6, 2006. This decision on the part of the Examiner unnecessarily complicates the issues remaining in the application.

Consequently, in the present appeal, Appellant wishes to appeal the final rejection of claims 18 and 31, under the presumption that claims 1 and 2 will eventually be cancelled and claims 3 and 4 placed in independent and allowable form. Thus, it should be understood that claims 1 and 2 are *not* involved in this appeal.

V. Summary of Claimed Subject Matter

One group of micro-electro-mechanical devices (MEMS) called Diffractive Light Devices (DLDs) produce colors based on the precise spacing of a pixel plate relative to lower (and possibly upper) plates. This spacing is the result of a balance of two forces: electro-static attraction based on voltage and charge on the plates, and a spring constant of one or more "support structures" maintaining the position of the pixel plate away from the electrostatically charged plate. One traditional approach for controlling the gap distance is to apply a continuous control voltage to the electrodes, where the control voltage is increased to decrease the gap distance, and vice-versa. However, precise gap distance control may be affected by several factors, including variations in the operating temperatures experienced by the DLD, the voltage applied to the DLD, material variations between support structures and other system variations. (Appellant's specification, paragraph 0003).

Accordingly, Appellant's specification discloses a feedback-control circuit for color calibration of a diffraction light device that includes at least one diffractive light device (DLD) having a gap distance defined by opposing plates, at least one sensor configured to convert light modulated by the DLD device into a light signal indicative of the gap, a controller configured to calculate a voltage correction value based on a difference between the gap as indicated by the light signal and a designer-specified gap value and being further configured to apply a corrected voltage corresponding to the voltage correction value to the DLD device. (Appellant's specification, paragraph 0011).

The calibration information reflects process and system variations that may cause the assumed gap value to vary from the designer-specified gap value. The corrected voltage adjusts the assumed gap value, allowing it to substantially correspond to the designer-specified gap value. The corrected voltage and the designer-specified gap values are then stored, such that they may be accessible to an operational circuit. The operational circuit controls DLD devices or a human visible array. These DLD devices are adjusted by accessing the stored corrected voltage and designer-specified gap values. As a result, the feedback control circuit continuously adjusts the DLD devices of a human visible array to account for process and system variations. (Appellant's specification, paragraph 0012).

Turning to the specific independent claims that are at issue in this appeal, independent claim 18 recites:

A method of calibrating a diffractive light device (DLD) (*Appellant's specification, paragraph 0039)*, comprising:

placing first and second opposing plates in a separated position defined by an actual gap distance (Fig. 5, 500) (*Appellant's specification, paragraph 0040)*;

directing light onto said DLD device to modulate that light (*Appellant's specification, paragraph 0041)*;

converting modulated light to an assumed gap value (Fig. 5, 510) (*Appellant's specification, paragraph 0043)*;

comparing said assumed gap value to a designer-specified gap value (Fig. 5, 520) (*Appellant's specification, paragraph 0044)*; and

adjusting said assumed gap distance by a distance proportional to a difference between said assumed gap value and said designer-specified gap value (Fig. 5, 530) (*Appellant's specification, paragraph 0045-46).*

Independent claim 31 recites:

A DLD system, comprising:

means (100) for diffracting light based on an actual gap distance (160);

means (325, 320, 340) for converting detected light values to assumed gap values (*Appellant's specification, paragraph 0043)*;;

means (400) for comparing said assumed gap values to designer-specified gap values (*Appellant's specification, paragraph 0044)*; and

means (380) for adjusting said actual gap distance to minimize the distance between said assumed gap values and said designer-specified gap values (*Appellant's specification, paragraph 0045-46).*

VI. Grounds of Rejection to be Reviewed on Appeal

In the final Office Action, claims 1, 2, 18 and 31 were rejected as anticipated under 35 U.S.C. § 102 by U.S. Patent No. 6,538,748 to Tucker et al. ("Tucker"). Appellant appeals this rejection as to claim 18 and 31. Therefore, Appellant respectfully request review of this ground of rejection as to claims 18 and 31 in the present appeal.

VII. Argument

Claim 18:

Independent claim 18 recites:

A method of calibrating a diffractive light device (DLD), comprising:
placing first and second opposing plates in a separated position defined by an actual gap distance;
directing light onto said DLD device to modulate that light;
converting modulated light to an assumed gap value;
comparing said assumed gap value to a designer-specified gap value; and
adjusting said assumed gap distance by a distance proportional to a difference between said assumed gap value and said designer-specified gap value.
(emphasis added).

In contrast, Tucker clearly fails to teach or suggest a method that includes "converting modulated light to an assumed gap *value*." Appellant notes that, in this context, "value" is defined as "a numerical quantity that is assigned or is determined by calculation or measurement." (*See* Merriam-Webster On-Line Dictionary, http://www.m-w.com).

In contrast, the Tucker system never produces a *value* for the gap between opposing plates of the optical device. Tucker further fails to teach or suggest "comparing said assumed gap *value* to a designer-specified gap *value*." (Emphasis added).

With reference to Tucker's Fig. 8, Tucker teaches a system in which a servo light signal from an optical device (360) is mixed with a reference laser (371). Beats between the frequencies of the two light sources are then counted by a counter (374) and a voltage correction is accordingly determined by a controller (375). (*See* Tucker, col. 5, line 51 to col. 6, line 12).

The final Office Action holds that the reference laser (371) taught by Tucker and its wavelength *represent* a designer specified gap value. (Action of 7/13/06, p. 3). While this may be true, the reference laser and its wavelength only "represent" a designer specified gap value. In making this argument, the final Office Action implicitly recognizes that no actual

designer-specified gap value is used by the Tucker system. Nor does the Tucker system use any actual measured or "assumed" gap value.

Tucker does not teach or suggest "converting modulated light to an assumed gap value" as claimed. Tucker does not teach or suggest "comparing said assumed gap value to a designer-specified gap value" as claimed.

Apparently recognizing the serious flaws in this argument from the final Office Action, the Advisory Action of September 15, 2006 strikes out in a new direction. The Advisory Action argues that "Tucker detects beats between frequencies of two light sources (a servo light signal and a reference laser) and counts the beats between the frequencies by a counter. This counting process requires the use of inputted values." (Advisory Action of 9/15/06, p.2). It is unclear exactly what the Advisory Action means by this argument.

Clearly, the counting of beats generates a value for the number of beats that have occurred. However, this value is not a value specifying the size of a gap between first and second opposing plates in a DLD, although such a gap value may potentially be derived with some effort from this beat count. However, Tucker never teaches such a derivation.

Thus, Tucker does not teach or suggest generating the claimed "assumed gap value" based on actual operation of the DLD. Tucker further does not teach or suggest "comparing said assumed gap value to a designer-specified gap value."

"A claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, the rejection of claim 18 based on Tucker should not be sustained.

Claim 31:

Independent claim 31 recites:

A DLD system, comprising:
means for diffracting light based on an actual gap distance;
means for converting detected light values to assumed gap values;
means for comparing said assumed gap values to designer-specified gap values; and
means for adjusting said actual gap distance to minimize the distance between said assumed gap values and said designer-specified gap values.
(emphasis added).

As demonstrated above, Tucker clearly fails to teach or suggest a system that includes "means for converting modulated light to an assumed gap value." The Tucker system never produces an actual value for the gap between opposing plates of the optical device and includes no means for doing so. Tucker further fails to teach or suggest "means for comparing said assumed gap value to a designer-specified gap value." The Tucker system does not teach or suggest a designer-specified *value* for the gap between the opposing plates or a means of comparing such a *value* to an assumed gap value as claimed.

Again, "[a] claim is anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). See M.P.E.P. § 2131. For at least these reasons, the rejection of claim 31 based on Tucker should not be sustained.

Claims 3 and 4:

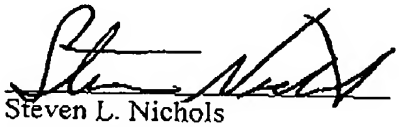
Claims 3 and 4 have been indicated as containing allowable subject matter. Consequently, no ground of rejection has been applied against these claims and those claims that depend from them.

Appellant would like to present these claims in independent form and, therefore, place them in condition for allowance along with any claims that depend therefrom.

In view of the foregoing, it is submitted that the final rejection of the pending claims is improper and should not be sustained. Therefore, a reversal of the Final Rejection of July 13, 2006 is respectfully requested.

Respectfully submitted,

DATE: December 13, 2006



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Rebecca R. Schow

VIII. CLAIMS APPENDIX

1. (original) A feedback-control circuit for color calibration of a diffraction light device, comprising:

at least one diffractive light device (DLD) having a gap distance defined by opposing plates;

at least one sensor configured to convert light modulated by said DLD device into a light signal indicative of said gap;

a controller configured to calculate a voltage correction value based on a difference between said gap as indicated by said light signal and a designer-specified gap value and being further configured to apply a corrected voltage corresponding to said voltage correction value to said DLD device.

2. (original) The control circuit of claim 1, wherein said sensor comprises a photodiode.

3. (previously presented) The control circuit of claim 1, wherein said controller further comprises a gap value converter having an analog-to-digital converter (ADC) and a static lookup table, wherein said ADC is configured to convert signals from said sensor to a digital value and wherein said lookup table is configured to output an assumed gap value based on said digital value.

4. (previously presented) The control circuit of claim 1, wherein said controller further comprises an analog-to-digital converter (ADC), a color vector generator, and a static lookup

table, wherein said ADC is configured to convert signals from said sensor to a digital value, wherein said color vector generator is configured to generate color vectors corresponding to said digital value, and wherein said static lookup table is configured to output an assumed gap value based on said color vectors.

5. (previously presented) The control circuit of claim 4, and further comprising an amplifier coupled to said static lookup table and said designer-specified gap value and being configured to output a voltage correction value by amplifying a difference between said designer-specified gap value and said assumed gap value.

6. (original) The control circuit of claim 5, further comprising a digital to analog converter coupled to said amplifier being configured to convert said voltage correction value to said corrected voltage.

7. (original) The control circuit of claim 5, further comprising an operational lookup table coupled to said amplifier and said designer-specified gap value and being configured to couple said designer-specified gap value and said actual gap value and store said designer-specified gap value and said actual gap value.

8-17. (allowed)

18. (original) A method of calibrating a diffractive light device (DLD), comprising:

placing first and second opposing plates in a separated position defined by an actual gap distance;

directing light onto said DLD device to modulate that light;

converting modulated light to an assumed gap value;

comparing said assumed gap value to a designer-specified gap value; and

adjusting said assumed gap distance by a distance proportional to a difference between said assumed gap value and said designer-specified gap value.

19. (original) The method of claim 18, wherein placing said first and second plates in said separated position occurs in response to an initial voltage corresponding to said designer-specified gap value being conveyed to said DLD device.

20. (original) The method of claim 18, wherein converting said light to an assumed gap value comprises directing said light through a color filter and onto a light sensor, converting an output of said light sensor into a digital signal, and converting said digital signal into said assumed gap value.

21. (original) The method of claim 20, wherein converting said digital signal into said assumed gap value comprises converting said digital signal to a plurality of color vectors, and comparing said color vectors to a lookup table.

22. (original) The method of claim 20, wherein converting said digital signal into said assumed gap value comprises comparing said digital signal to a lookup table.

23. (original) The method of claim 20, wherein adjusting said actual gap distance comprises amplifying a difference between said assumed gap value and said designer-

specified gap value to obtain a voltage correction value, and applying a corrected voltage based on said voltage correction value to said DLD device.

24. (original) The method of claim 23, further comprising correlating and storing said designer-specified gap value and said voltage correction value on an operational lookup table.

25. (previously presented) The method of claim 18, wherein said method is carried on continuously.

26-30. (allowed)

31. (previously presented) A DLD system, comprising:

means for diffracting light based on an actual gap distance;

means for converting detected light values to assumed gap values;

means for comparing said assumed gap values to designer-specified gap values; and

means for adjusting said actual gap distance to minimize the distance between said assumed gap values and said designer-specified gap values.

32. (original) The system of claim 31, and further comprising means for storing said designer-specified gap and for storing a voltage correction value based on a difference between said designer-specified gap value and said assumed gap value.

33. (original) The system of claim 32, and further comprising means for converting said voltage correction value to a correction value.

34. (previously presented) The system of claim 32, and further comprising means for adjusting a human visible array based on values stored in said means for storing said designer-specified gap and for storing said voltage correction value

35. (previously presented) The control circuit of claim 3, and further comprising an amplifier coupled to said static lookup table and said designer-specified gap value and being configured to output a voltage correction value by amplifying a difference between said designer-specified gap value and said actual gap value.

36. (previously presented) The control circuit of claim 35, further comprising a digital to analog converter coupled to said amplifier being configured to convert said voltage correction value to said corrected voltage.

IX. Evidence Appendix

None

X. Related Proceedings Appendix

None

XI. Certificate of Service

None